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# CURRENT LITERATURE

## BOOK REVIEWS

### Some elementary textbooks

The series of well-known and very successful elementary texts of BERGEN has been increased by a new one in collaboration with DAVIS.<sup>1</sup> Every successful teacher of botany recognizes that there are possible different lines of approach to the subject. Hence it is quite usual for textbooks to be so arranged as to permit selection and rejection to fit the desires of various teachers. However, when two plans of organization are carried out practically throughout the whole plant kingdom, really two courses in botany are provided for. Such is the arrangement of the book under consideration, which consists essentially of two books bound together.

Part I, on "The structure and physiology of seed plants," and Part III, on "Ecology and economic botany," comprising 299 pages of the book, are by Professor BERGEN. They have a distinctive method of presentation, and include most of the topics found in the widely used and successful *Foundations of botany* which the present book is designed to supplant. Part II (256 pages), on "The morphology, evolution, and classification of plants," is by Dr. DAVIS. Parts I and III are topical in nature, while Part II is arranged according to the increasing complexity of the plant kingdom. The authors suggest that "the whole will furnish material for a full year's work," usually omitting portions, and "that a half-year course can be readily arranged by selections from the more general sections of the book."

The work begins with three chapters on the seed and seedling, followed by two upon roots, three upon stems, others upon form and arrangement of buds and leaves and upon the minute structure and the function of leaves. The remaining chapters of Part I deal with the flower and fruit. In Part III, in addition to the rewritten chapters on topics usually found under the caption of ecology, there is a chapter on "Plant breeding" and one on "Some useful plants and plant products." These are the best statements of these topics that have appeared in elementary texts of botany, and constitute a valuable addition to the work as previously outlined in *Foundations of botany*.

Part II is a detailed statement of existing knowledge of the evolution of plants, insofar as that knowledge is based upon morphology and cytology. The second paragraph in this part reads as follows:

One department of morphology (comparative morphology) deals with the various forms or disguises which the same sort of organ may take in different kinds of plants,

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<sup>1</sup> BERGEN, JOSEPH Y., and DAVIS, BRADLEY M., *Principles of botany*. pp. ix+555. Boston: Ginn and Company. 1906.

and compares these structures with one another. For example, the foliage leaf is a well-defined organ which can be recognized at a glance; but it requires some study to understand that the scales on the bud and around an onion, and also some forms of spines and tendrils are morphologically leaves, that is, are leaves variously modified. Because all of these structures are related to one another, they are called *homologous*, and morphology studies the *homologies* or relationships of organs. Comparative morphology is one of the interesting subjects of biological study, since it furnishes the basis for the established belief in the evolution or development of the higher plants and animals from simpler forms.

Furthermore, before beginning the study of types, the author says concerning the process of evolution:

The forms and groups split up into divergent lines which constantly gave off, and are still giving off, new shoots. Thus from a number of trunks in the beginning there have been derived a multitude of smaller branches, and from these in turn have arisen countless twigs. It is impossible to construct accurately these genealogical trees, because the species now living occupy the position of buds on the structure, some relatively low down and some at the highest points, but all at the ends of their respective lines of development.

If the student has come to the second part after a careful study of the first, the foregoing paragraphs possibly may be significant to him. If, as a suggested possibility in the preface, the student should begin his study with the second part, such statements must prove bewildering. Presumably he knows little or nothing of the terms used nor of the structures or organs of which they speak, and it would seem that attempts at this point to show the significance of "comparative morphology" would be lost. Also, within the first dozen pages the difficult topic of photosynthesis, with the outlines of the chemical formulae involved, is presented within the limits of a page. Upon a clear understanding of this topic the significance of much of the subsequent work must depend, and if the chemistry of the process is presented at all, it should be in such a form as to be understood by immature minds.

The number of types used and the detail with which their part in the evolutionary story is presented are far greater than has yet appeared in a text designed for elementary use. Indeed few texts used by college classes are so inclusive. It is difficult to understand just how elementary students are going to see the significance of such discussions as (1) that of reduction of chromosomes in *Coleochaete* as related to claims of a sporophytic generation in that plant; (2) of the "Imperfect fungi;" (3) of the "Evolution of the flower;" (4) of frequent reference in brackets or otherwise to highly specialized genera that are unexplained in the text. The author suggests that such topics be omitted if thereby the teacher's ideas are met in a better way; but in many cases subsequent discussion involves a knowledge of these features. A summary at the end of each group serves to simplify many of the more difficult points.

A highly commendable feature is the introduction of such topics as "Public health," and "Fossil plants and coal." Frequent suggestions as to economic aspects of plants under discussion add much to the value of this part of the book,

as is also true of Parts I and III. The entire book is profusely and well illustrated, some most helpful diagrams being included. While the book as a whole is too heavy for the average high-school work, it will be almost indispensable as a reference work because of its large amount of information, its abundant illustrations, and its helpful suggestions as to the significance of structures and their relationship to one another. A glossary of terms used and a laboratory guide to accompany the text are in process of preparation by the authors. It is unfortunate that the glossary of terms is not bound with the text including the terms to be explained.

The series of texts prepared by COULTER has also been increased.<sup>2</sup> In former textbooks by Professor COULTER, separate treatment was given to morphology and ecology, with work in physiology less distinctly outlined. Those books, while possibly not so extensively used as some others, certainly served as the strongest stimulus in bringing about the introduction of modern botany to supplant the rather mechanical and less representative work that had prevailed in high schools. The testimony of some teachers indicates that at least for some schools *Plant Structures* represents a course too difficult for the students, and that *Plant Relations* is not sufficiently representative of plant processes. *Plant Studies* is made up essentially of parts of the two preceding books bound together. In the new text the author has attempted to articulate more closely morphology, physiology, and ecology presenting morphological features more prominently than others.

The first five chapters include a presentation of "the structure, function, and relationship of the most obvious plant organs." The plants selected as types in these chapters are all seed plants, those most familiar to high-school pupils, and most readily examined by inexperienced observers. Following this general discussion, eight chapters are given to a consideration of the great groups of plants, beginning with Cyanophyceae and ending with angiosperms, giving an outline of the typical structures, functions, and habits found in each group. Chapter XIV treats of "Pollination," XV of Seed dispersal," XVI to XVIII of the leading families of monocotyledons and dicotyledons, XIX of "Plant breeding," XX of "Forestry," and XXI to XXIV of "Plant associations."

There are several important points in which this book is conspicuously unlike preceding ones by the same author. Botanical terminology is simplified in form and less frequently used. The types selected and the style in which they are presented results in a much simpler treatment of the plant kingdom than in *Plant Structures*. Frequent interpolation of statements concerning economic uses of plants under consideration adds interest and gives a measure of satisfaction to the student's desire for a knowledge of utility. The far too brief chapters on "Plant breeding" and "Forestry" give but a meager suggestion of these prac-

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<sup>2</sup> COULTER, JOHN M., A text-book of botany. pp. ix+365. New York: D. Appleton and Company. 1906.

tical phases of botany. The reduction of the space given to plant associations to thirty pages leaves this topic more nearly within the bounds in which it should be found in a general elementary course in botany. But the most important of all the new features of the book is its general plan of organization: first a general introduction to plant structures and functions by the use of the most accessible and best known plants; second upon this foundation follows a presentation of groups in logical order, a knowledge of structure being that around which a knowledge of use and adjustment is arranged, this being done, however, without classifying the different phases definitely into morphology, physiology, and systematic botany; and thirdly, a presentation of special phases of plant life follows the laying of general foundations.—OTIS W. CALDWELL.

### Water plants

The literature pertaining to water plants promises to be greatly enriched through a series of studies by GLÜCK.<sup>3</sup> The first volume (unhappily called *Erster Teil*, though a book in itself, the second "part" being likewise an independently paged volume) deals with European Alismaceae, of which 8 species, representing 5 genera, were studied. This study differs from that of SCHENCK, SAUVAGEAU, and others, in that while they have specially treated the anatomical or geographical aspects, the emphasis here is chiefly on the biological side and by experimental methods. This shifting from the static to the dynamic is in harmony with the present trend of investigation. The book will be of interest to the ecologist and morphologist, and has as well a message for the systematist.

Part I of this first volume is descriptive of the experiments. Plants were studied in various relations to water, the cultures approximating all ordinary conditions of the uncultivated state. Typical of the author's methods is his treatment of *Alisma Plantago*. He studied first the land forms and those growing in water of various depths. Records were kept of macroscopic observations, measurements of parts, and peculiarities of behavior. Land-grown seedlings were then subjected to various aquatic conditions, even to submergence at depths as great as four meters. Older land plants were also subjected to similar experiments. Both, under certain conditions, determined by size of plant and amount of stored food, took on the form of leaf usually characteristic of the habitat. In some experiments water plants were transformed to land forms. There were also observations on the influence of habitat on the formation of flowers and fruit, and the conditions in which plants pass the winter.

While the results demonstrate the remarkable plasticity of these forms, there seem, however, to be rather definite limits to their variability. For example, the experiments seem to have established the correctness of the old division of *A.*

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<sup>3</sup> GLÜCK, HUGO, Biologische und morphologische Untersuchungen über Wasser- und Sumpfgewächse. Erster Teil: Die Lebensgeschichte der europäischen Alismaceen. 8vo. pp. xxiv+312. pls. 7. figs. 25. Jena: Gustav Fischer. 1905. M 20.